

REMARKS

This application has been reviewed in light of the Office Action dated June 29, 2006. Claims 40-62 are presented for examination. Claims 61 and 62 have been added. Claims 40, 46, 52, 58, and 61 are in independent form. Favorable reconsideration is requested.

Claims 40-60 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,333,598 (Hsu et al.) in view of the publication by Rodriguez et al., entitled "Catalytic Engineering of Carbon Nanostructures," Langmuir 11, pp. 3862-3866 [1995], hereinafter "the Rodriguez article". This rejection is respectfully traversed for the following reasons.

Independent Claims 40, 46, 52 and 58 recite arranging a plurality of carbon fibers on the first electrode, so that a height of at least a part of the carbon fibers from the substrate is larger than a height of the second electrode from the substrate.

According to an aspect of the invention to which those independent claims relate, a carbon fiber of a characteristic crystal structure is provided, and at least a part of the carbon fiber is disposed at a greater distance from a surface of a substrate than is a surface of a second electrode. By virtue of those features, an electron-emitting device having excellent electron emission efficiency is provided (see, e.g., from page 26, line 10 to page 27, line 10 of the application). Also, by virtue of using the fiber of the crystal structure as an emitter, an electron flows along the stacked graphenes, and an electron can be emitted not only from the end of the fiber but also from positions before the fiber end.

Thus, even fibers are straight or curved, electron(s) can be emitted even from, for example, a middle of the fibers. Accordingly, even without aligning the ends of the fibers at a position at which an electric field is collected, electron(s) can be emitted easily from the fibers. Moreover, undesirable collisions of an emitted electron with a second electrode can be reduced, and thus the electron can efficiently reach the anode.

In a case of using a carbon nanotube as an emitter in Hsu et al., an electron can be emitted only from an end of the carbon nanotube. Accordingly, in such a case, in order to improve the electron emission efficiency, it would be necessary to align the end of the fibers at a position at which an electric field is collected. Such an alignment of the carbon fiber ends would be extremely difficult, if not impossible, to achieve.

The Rodriguez article was cited in the Office Action as teaching graphenes stacked in various manners. Applicant respectfully submits that Rodriguez fails to disclose or suggest a need to reduce undesirable collisions of an emitted electron with an electrode, let alone applying carbon nanofiber to an electron-emitting device. Accordingly, there would have been no reason why one skilled in the art would have even consulted the Rodriguez article, let alone been motivated to modify or replace the carbon nanotube of Hsu et al. using the carbon nanotube disclosed in Rodriguez, as proposed in the Office Action. Indeed, the Office Action's suggestion to combine Hsu et al. and the Rodriguez article is believed to constitute impermissible hindsight reasoning, since it proposes to combine the references to achieve a result gleaned solely from Applicant's disclosure, without any teaching, suggestion, or motivation in the prior art to do so. Uniroyal, Inc. v.

Rudkin-Wiley Corp., 837 F.2d 1044, 1051-52, 5 USPQ 2d 1434, 1438 (Fed. Cir. 1988) (it is impermissible to reconstruct the claimed invention from selected pieces of prior art absent some suggestion, teaching, or motivation in the prior art to do so); In re Fritch, 972 F.2d 1260, 23 USPQ 2d 1780 (Fed. Cir. 1992) (“[I]t is impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious. . . . This court has previously stated that ‘[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.’”).

Moreover, because, as described above, in Hsu et al. an electron can be emitted only from an end of a carbon nanotube, then even if, assuming *arguendo*, that reference were to be combined with the Rodriguez article in the manner proposed in the Office Action, the resulting combination still could not achieve the above-described advantages achieved using the stacked graphenes of the invention. Indeed, because alignment of the carbon fiber ends where an electric field is collected would be extremely difficult, if not impossible, to achieve, there would have been no reasonable expectation that the combination could be successfully achieved in the first place. MPEP 2143 (“To establish a *prima facie* case of obviousness, . . . there must be a reasonable expectation of success.”).

For all of the foregoing reasons, Applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness against Claims 40, 46,

52, and 58, and that those claims are patentable over the art relied on to reject those claims in the Office Action.

Independent Claim 61 recites a method of manufacturing an electron-emitting device to be arranged in opposition to an anode electrode, the electron-emitting device having on a surface of a substrate a cathode electrode, a gate electrode, and a fiber containing carbon as a main ingredient arranged on the cathode electrode. The method comprises (a) preparing the substrate being insulating and having on the surface thereof, the cathode electrode having a catalyst on a surface thereof, and the gate electrode arranged separately from the cathode electrode. The method also comprises (b) forming, on the cathode electrode, by decomposing hydrocarbon gas according to a heating process using the catalyst, as the fiber containing carbon as a main ingredient, a fiber having a plurality of graphenes that are not parallel to an axis direction of the fiber and being stacked in the axis direction of the fiber, so that the fiber has a portion which is positioned at a shorter distance from the anode electrode rather than is a distance between the anode electrode and the gate electrode.

It is respectfully submitted that neither Hsu et al. nor the Rodriguez article teaches or suggests those features. Accordingly, Claim 61 is believed to be clearly patentable over those references, whether considered separately or in combination.

Each of the dependent claims depends on one or another of the independent claims discussed above, and also is believed to be patentable over the art relied on in the

Office Action, at least for the reason that each depends from a patentable base claim. Nonetheless, because each dependent claims recites an additional aspect of the invention, the individual consideration or reconsideration, as the case may be, of each on its own merits is respectfully requested.

Applicant respectfully requests favorable entry hereof, reconsideration, and early passage to issue of the present application. Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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